Clinical Assessment - A Computer-Based Aid to Assessing the Clinical Problem Solving Ability of Medical Students

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Clinical Assessment, a computer-based program designed to assess the clinical problem-solving skills of medical students, has been developed by the MGH Laboratory of Computer Science and the Harvard Medical School Pediatric faculty. This objective method of evaluating student performance can supplement the traditional grading method used by the course director of a clinical clerkship.

The Clinical Assessment program employs a graphical user interface with mouse and keyboard input to provide a number of stages in which the student gathers information about a simulated patient's condition and formulates diagnostic hypotheses. The case begins with a limited amount of clinical information about the presenting symptoms of a patient with a classic pediatric problem. The student is instructed that since the setting for each case is the Emergency Room, the workup for the simulated patient needs to be focused and not exhaustive. The student enters an initial list of diagnoses which should be considered given the set of findings presented. Each diagnostic entry is analyzed using an interactive text recognition algorithm. The program may present possible word or concept lists if the student entry is not understood as entered. The student then chooses up to ten information items (symptoms, signs, etc.) from the History and Physical Exam menus with the instructions to select items which are useful in determining the diagnosis and the severity of the patient's illness. Immediate "results" are given for each item; some are text responses while others are multimedia responses in the form of images or sounds. The student enters a revised diagnostic impression and is then allowed to select information items from a Laboratory menu as well as the History and Physical Exam items until ready to make a final diagnosis. After entering the final diagnosis, the student identifies those information items selected during the workup which are believed to be the most useful in establishing the diagnosis and in estimating the severity of the disease. In the program's final stage, the student is presented a Therapy menu and orders treatment items pertinent for the simulated case and selects a disposition for the patient. Instructions specific to each stage of the program are provided on each frame. Students can enter a comment easily at any point in the interaction by clicking a button and writing the comment to a screen overlay note pad. Comments are then stored for author review.

In the present method of use, the student receives no immediate evaluation analysis from the program; instead, his/her performance is evaluated by the computer and made available as a case analysis report for a faculty member to review with the student. The scoring algorithm, a complex process which continues to be reviewed and modified, attempts to analyze several different components of clinical problem solving. These components include: diagnostic impressions at various points in the workup, selection of the most appropriate information to clarify the differential diagnosis while considering the risk/cost of each item, interpretation of the images and sounds presented as well as textual descriptions of findings, and justification of the final diagnosis from the information gathered. Less weight accrues to scoring for selection of appropriate therapy.

The Clinical Assessment program is now installed in several Pediatric Clerkship sites for student use and evaluation. The current version presents an annotated sample case and four examination cases to each student. Current cases are drawn from two categories: cough and fever, and abdominal pain. Cases under development include newborn respiratory distress, rashes, and anemia. An administrative system allows course administrators to register students, assign passwords and receive usage reports as well as individual case analysis reports. After pilot testing, the program will be used for grading in the core Pediatric clerkship, constituting about 10% of the final grade.

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